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# The adaptive behaviour characteristics of learning disabled children classified by patterns of academic achievement.

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THE ADAPTIVE BEHAVIOUR CHARACTERISTICS OF LEARNING DISABLED  
CHILDREN CLASSIFIED BY PATTERNS OF ACADEMIC ACHIEVEMENT

by

© MARY LOUISE STEWART

A thesis  
presented to the University of Windsor  
in partial fulfillment of the  
thesis requirement for the degree of  
MASTER OF ARTS  
in  
Psychology

Windsor, Ontario, 1986

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# DEDICATION

To my parents, Andy and Isabel Stewart,  
who travel along the road with me.

## ABSTRACT

The purpose of this study was to investigate the adaptive behaviour functioning of 9- to 14-year-old learning disabled children classified into subtypes according to their patterns of academic achievement. Earlier studies using this method of classification have reported significant group differences on a variety of neuropsychological, behavioural, and personality measures. However, the adaptive behaviour of children in these subtypes has not been investigated in the areas of communication, daily living, and socialization skills. In this study, two groups of 9- to 14-year-old learning disabled children ( $n = 10$  in each group) were established in the following manner: (1) children in the first group (Group 1 subtype) presented with uniformly deficient performances on the Reading, Spelling, and Arithmetic subtests of the Wide Range Achievement Test, and (2) children in the second group (Group 3 subtype) exhibited average or above-average performances on the Reading and Spelling subtests, but performed in a significantly inferior manner on the Arithmetic subtest. It was hypothesized that Group 3 children would perform in a superior manner to Group 1 children in communication abilities, and inferior to Group 1 children in daily living



and socialization skills. These hypotheses were partially supported, as Group 3 children performed in a significantly superior manner to the Group 1 children on the communication measure. Specifically, Group 3 children were superior to Group 1 children in written communication skills. The hypothesis that Group 3 children are deficient in overall adaptive functioning was not supported by the results of this study. However, as predicted, Group 3 children were found to have more maladaptive behaviours compared to Group 1 children. The relationships of the present findings to previous studies, the theoretical implications of the results, and suggestions for future research are discussed.



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## Chapter I

### INTRODUCTION

#### NEUROPSYCHOLOGICAL ASSESSMENT OF CHILDREN WITH LEARNING DISABILITIES

The assessment and treatment of children with learning disabilities have been given considerable attention by researchers in school and clinical settings. Approximately 10 to 15 percent of North American school children experience learning difficulties severe enough to require remedial help (Benton, 1975). The determination of exact prevalence estimates is complicated, however, by different criteria used to define learning disabilities.

One neuropsychological approach to the explanation of learning disabilities (e.g., McCarthy & McCarthy, 1969) identifies children with learning disabilities by eliminating children whose behaviour can be explained on a basis other than cerebral dysfunction. According to this view, "when mental retardation, emotional disturbance, sensory deprivation, or cultural or instructional factors have been excluded as pertinent etiological considerations, cerebral dysfunction can then be presumed to be responsible for the learning deficit" (Bourke, 1975, p. 911). This approach to a definition of learning disabilities requires

empirical justification, however. A number of studies have attempted to address identification and classification issues. What follows is a summary of the research efforts emphasizing a neuropsychological approach to the assessment of learning disabled children.

The neuropsychological approach to the assessment of children with learning disabilities has been directly influenced by adult neuropsychology, the concept of cerebral dysfunction, and the tradition of differential diagnosis (Fletcher & Taylor, 1984). Several methods of inquiry derived from these three sources have been successfully applied to children. These methods include the level of performance, pathognomonic sign, lateralization, and differential score approaches, as described by Fourke (1975, 1978). Fletcher and Taylor (1984) caution, however, that the child neuropsychologist is limited in drawing inferences regarding the status of the child's brain when using tests and interpretations designed originally for adults. To circumvent this difficulty and to incorporate development in neuropsychology, Fletcher and Taylor propose a functional organization approach which emphasizes the importance of behaviour relationships and processes of change. This approach focuses attention on the functional behavioural deficiencies exhibited by the child rather than on the hypothesized dysfunction underlying the deficiencies.


The complexity of inferring brain-behaviour relationships from behavioural test data has not, however, prevented the development of brain-based theoretical frameworks. For example, a recent model of hemisphere specialization (Goldberg & Costa, 1981) emphasizes differences between right hemisphere and left hemisphere systems. In this theoretical context, Goldberg and Costa's review of the differential neuroanatomy of the two hemispheres suggests two plausible cognitive consequences:

1. The right hemisphere has a greater neuronal capacity to deal with informational complexity.
2. The right hemisphere has a greater ability to process many modes of representation within a single cognitive task, while the left hemisphere is superior in tasks which require fixation upon a single mode of representation or execution (p. 148).

Rourke (1982) has adapted Goldberg and Costa's theory of right-left hemisphere system differences into a model of central processing deficiencies in children. Both normal children and subtypes of learning disabled children are included in this developmental model. As well, "variations in normal reading skills, spelling disabilities, mechanical arithmetic performances, and social learning" (p. 16) are addressed in the model.

The neuropsychological assessment of learning disabled children requires a comprehensive evaluation of a wide range of abilities in addition to, and in conjunction with, models





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of brain functioning. Rourke (1976) proposes that a comprehensive neuropsychological assessment of children's strengths and weaknesses will include measures of the following: (a) verbal and auditory-perceptual skills, (b) visual-perceptual, visual-spatial, and tactile-perceptual skills, (c) motor and psychomotor abilities, (d) conceptual and reasoning skills, and (e) academic achievement.

#### CLINICAL TAXONOMIC TECHNIQUES IN NEUROPSYCHOLOGICAL ASSESSMENT

The comparison of a group of undifferentiated learning disabled children to a group of equally undifferentiated controls is unsatisfactory in many respects since such approaches obscure any differences existing within the learning disabled group. It is evident from neuropsychological research (e.g., Benton, 1975; Rourke, 1978) that learning disabled children vary in their patterns of performance and thus constitute a heterogeneous population.

Neuropsychological variables. One neuropsychological approach to the classification of learning disabled children has been to form groups of children based on their patterns of performance on neuropsychological variables.

A number of studies have used differential score performance on the Wechsler Intelligence Scale for Children (WISC; Wechsler, 1949) and on the Wide Range Achievement Test (WRAT; Jastak & Jastak, 1965) to establish groups of

learning disabled children. For example, 9- to 14-year-old learning disabled children were grouped according to WISC Verbal IQ - Performance IQ profiles: High Verbal - Low Performance (HV-LP), High Performance - Low Verbal (HP-LV), and Verbal = Performance (V=P) (Bourke, Young, & Flewelling, 1971; Bourke & Teledgy, 1971). Children in the HV-LP group were superior to the HP-LV group on measures of auditory-perceptual and linguistic skills, whereas the HP-LV group was superior on visual-perceptual tasks and on most measures of complex motor and psychomotor skills.

When 5- to 8-year-old children were classified according to these WISC IQ profiles, similar patterns of performance were present on measures of verbal, auditory-perceptual, and visual-perceptual skills. The patterns of results found with older children on measures of motor and psychomotor functioning, however, were not replicated with the younger children (Bourke, Dietrich, & Young, 1973). The lack of significant findings on these latter measures may reflect a general lag in sensory-motor development in younger children with learning disabilities, as proposed by Kephart (1960). In addition, many of the tests used with these younger children were too difficult for them, or appeared to measure different skills and abilities. These results argue for cautious clinical interpretation of Verbal IQ-Performance IQ discrepancies in younger learning disabled children.

b

A series of investigations has compared groups of children differing in their patterns of academic achievement and in their performance on a wide range of neuropsychological measures. The first investigation in this series involved three groups of youngsters divided according to three patterns of performance on the WRAT. Group 1 was composed of children uniformly deficient in reading, spelling, and arithmetic on the WRAT; Group 2 children were deficient in reading and spelling as compared to their arithmetic performance (which was below normal); and Group 3 children exhibited normal reading and spelling but they were quite deficient in arithmetic. Bourke and Finlayson (1978) compared the performances of the three groups on verbal, auditory-perceptual, and visual-perceptual measures. They found that Group 3 children were superior to Group 2 children on all verbal and auditory-perceptual measures. Group 2 children, however, were superior to Group 3 children on visual-perceptual measures.

In a second study, Group 3 children also exhibited marked deficiencies relative to Group 1 and Group 2 children on psychomotor and tactile-perceptual tasks. These (Group 3) children displayed bilateral impairments on two measures of psychomotor abilities (Grooved Pegboard Test & Maze Test; Klove, 1963) and their left-hand and both-hands performances on the Tactual Performance Test (TPT; Reitan & Davison, 1974) were also quite deficient (Bourke & Strang, 1978).

The third investigation in this series compared Group 2 and Group 3 children on a test of concept formation (Halstead Category Test; Reitan & Davison, 1974) that involves nonverbal abstract reasoning, hypothesis-testing, and the ability to benefit from feedback. Strang and Rourke (1993) found that Group 3 children exhibited poor performance on this test compared to Group 2 children. These nonverbal concept formation deficiencies of Group 3 children appear to relate directly to the problems they experience with mechanical arithmetic (e.g., they do not seem to understand the mathematical concepts).

In an effort to replicate the results of these three studies with younger children, Ozols (1984) compared 7- and 8-year-old children classified as either Group 2 or Group 3 subjects. Most of the group differences previously noted were found in her study; however, the expectation of significantly inferior performance of the Group 3 children on the Category Test was not supported.

#### STATISTICAL TAXONOMIC TECHNIQUES

Statistical approaches to the classification of learning disabled children differ from clinical approaches in the nature of the data analysis employed. In clinical studies, subtypes of learning disabled children are derived on the basis of several selection criteria measures and then compared on a number of other variables. In statistical

studies, techniques such as Q -factor analysis are used to derive subtypes of learning disabled children on the basis of similar performance on several test measures.

Statistical classification techniques have been applied to an analysis of reading measures using the Q -technique of factor analysis. Doehring and Hoshko (1977) used this method for classifying children into reading disability subtypes. They presented 31 tests of reading-related skills to groups of children with reading problems and found three distinguishable subtypes. The first subtype (  $n = 12$  ) performed well on tests of visual and auditory-visual matching and poorly on oral reading tests involving words and symbols. The second subtype (  $n = 11$  ) was able to perform well on visual scanning tests involving numbers and letters, but performed poorly on auditory-visual letter matching tasks and on oral reading tasks involving words. In contrast, the third subtype (  $n = 8$  ) performed poorly on visual and auditory-visual matching of words and syllables although tasks involving visual and auditory-visual matching of single letters were performed well. These subtypes thus appear to have distinct oral reading deficiencies, difficulty in associating letters, and problems in perceiving sequences of words, respectively. Doehring and Hoshko (1977), and later Doehring, Hoshko, and Eryans (1979), were able to demonstrate with these results that children can be statistically classified into subtypes representing different patterns of reading deficit.

Neuropsychological variables. Q-type factor analysis has also been used to identify subtypes of 7- and 8-year-old reading disabled children on the basis of differential patterns of performance on various neuropsychological measures. Petruskas and Rourke (1979) obtained three reliable subtypes of readers similar to other subtypes reported in the literature. The largest subtype (  $n = 40$  ) had well-developed visual-spatial and eye-hand coordination abilities but clear deficiencies in auditory-verbal and language-related skills. The second subtype (  $n = 26$  ) appeared to have a sequencing deficit and evidence of finger localization difficulties. The third subtype (  $n = 13$  ) had deficiencies in verbal-retentive and expressive language skills and in eye-hand coordination abilities. Petruskas and Rourke suggested from these results that deficiencies in auditory-verbal skills are involved in a large proportion of reading difficulties, and that deficiencies in other (e.g., visual-spatial) skills may be related to reading deficits but to a lesser extent.

Fisk and Rourke (1979) also used Q-factor analysis to generate subtypes of 9- to 14-year-old learning disabled children from a battery of neuropsychological measures. The children were selected on the basis of uniformly poor performances on the Reading, Spelling, and Arithmetic subtests of the Wide Range Achievement Test. The three subtypes subsequently classified in this study all performed

poorly on a variety of auditory-verbal and psycholinguistic tasks; however, their visual-spatial and visual-organizational abilities were average.

Thus, statistical classification techniques have been useful in deriving subtypes of learning disabled children from a larger, heterogeneous population. It is evident, however, that the number and type of variables used in a particular study will have an effect on the subtypes derived.

#### LEARNING DISABILITIES AND EMOTIONAL DISTURBANCES

Learning disabilities in children have often been associated with emotional disturbances. There are three positions which have been taken with respect to this relationship: (1) emotional disturbances lead to learning disabilities, (2) learning disabilities lead to emotional disturbances, and (3) a third factor is responsible for both learning disabilities and emotional disturbances (Rourke & Fisk, 1981). The first position may not be applicable if the definition of learning disabilities used rules out primary emotional disturbance as a causative factor (e.g., McCarthy & McCarthy, 1969). The presence of socioemotional factors that are responsible for learning difficulties in school precludes the child from having a learning disability per se.

Studies of "learning disabled" versus "normal"

children. Some support for the second position (that learning disabilities lead to emotional disturbances) is provided by studies which compare undifferentiated learning disabled children to equally undifferentiated "normal" children. Bryan (1974a, 1976) found that learning disabled children were less favorably perceived by their peers than were non-learning disabled children, and their social status appeared to be lower as well (Bruininks, 1978). Some discrepancy is also apparent between the perceived and actual social status of learning disabled children. For example, Riber (1978) found that the social status of learning disabled children was rated as low by their peers.

In contrast, the self-ratings of the learning disabled children were much higher. Bryan and Wheeler (1972) and Bryan (1974b) reported that learning disabled youngsters appear to interact less frequently with their teachers than do non-learning disabled children. In addition, learning disabled children were less attentive to task-oriented activities (e.g., reading) and they engaged in more non-task-oriented behaviours (e.g., staring out a window). On the basis of these findings, children classified as "learning disabled" in the classroom appear to have problems in social relations involving both peers and teachers compared to "normal" children.



Intellectual and academic variables. The socioemotional functioning of children identified as "learning disabled" and classified according to intellectual and academic criteria has also been investigated. For example, Wiener (1980) divided learning disabled children into three groups according to their dominant deficit on the WISC (i.e., conceptual, spatial, or sequential problems). Children with conceptual and spatial disabilities obtained significantly lower ratings on measures of peer popularity than did children with sequential difficulties. Badian and Ghublikian (1983) compared children low in mathematical computation skills and high in reading comprehension ability with children exhibiting the reverse pattern (i.e., low reading and high math). They found that the child who is a good reader but poor at mathematical computation is "frequently inattentive, is disorganized and inexact in manner of working, avoids responsibility, and probably completes assignments less often than peers" (p. 157). These findings appear to agree with Johnson and Myklebust's (1967) report that children with dyscalculia, a deficiency in calculating, tend to be low in social maturity, assignments, and tactfulness.

Environmental variables. Family dynamics and their effect on learning disabled children's socioemotional functioning have been investigated in studies of children with reading problems. Goldman and Barclay (1974) noted

that mothers of retarded readers have a tendency to discourage, or at least not foster, the verbal fluency of their children. These mothers also minimized communication with their reading disabled children and they were more likely to foster a dependent relationship in these children.

A study by McDermott (1977) suggested that parents' perceptions of, and interactions with, their learning disabled children play an important role in the adjustment of these youngsters. The parents of diagnosed reading-problem boys (RPs) were separately observed while they interacted with their normally-achieving male siblings (NAs) as they performed a nonreading achievement task. McDermott found that fathers were more overtly negative, rejecting, and derogatory with RPs than with NAs, and mothers exhibited tendencies towards being more positive with NAs than with RPs.

These studies suggest that learning disabled children's problems may not be purely academic, cognitive or intellectual, but they may also involve the parents' perceptions and patterns of interaction with these children.

While it appears that learning disabilities and socioemotional disturbances are related, the causality of this relationship is unclear. There is evidence that many learning disabled children do not exhibit any form of socioemotional difficulties. Research findings which refute the second position (that learning disabilities produce emotional disturbances) will be examined presently.

There has not been much attention paid to the third position, which suggests that a third factor is responsible for both learning disabilities and emotional disturbances. If different patterns of central processing deficits produce different types of learning disabilities, they might also be expected to render the child at risk for different types of personality and socioemotional disturbances.

Behavioural and personality dimensions. There have been few studies which have attempted to determine if particular subtypes of learning disabled children are at greater risk for developing various socioemotional disturbances. It would seem reasonable to expect that children with specific patterns of central processing deficits may also exhibit specific patterns of behavioural and personality functioning, as well as particular academic deficiencies.

A recent study by Porter and Bourke (1985) was designed to investigate whether the learning disabled population is heterogeneous with respect to socioemotional functioning. The Personality Inventory for Children (PIC; Wirt, Lachar, Klinedinst, & Seat, 1977), a 600-item true-false questionnaire concerning the child's behaviour, attitudes and interpersonal relationships, was administered to the child's parents and the scores were subjected to factor analysis. Porter and Bourke were able to classify 77 percent of the subjects into four subtypes of personality

functioning. The children in the first and largest group ( $n = 37$ , 44 % of those classified) exhibited balanced and well-adjusted socioemotional functioning. The second group ( $n = 20$ , 26 % of those classified) evidenced a great deal of internalized socioemotional disturbance related to many aspects of social and academic difficulties. The third group ( $n = 10$ , 13 % of those classified) was noted for its high proportion of somatic complaints concerning the child's health. The children in the fourth group ( $n = 13$ , 17 % of those classified) exhibited considerable externalized behavioural disturbances involving hyperactivity, antisocial behaviour, interpersonal insensitivity, and aggression.

These results contradict the notion that learning disabilities in children coincide with a particular pattern of socioemotional functioning. Since approximately one-half of the learning disabled children classified in this study exhibited normal personality functioning on the PIC, the position that learning difficulties lead to socioemotional disturbances may not be entirely valid.

Strang and Rourke (1985a) were able to demonstrate that learning disabled children, who exhibit different patterns of verbal and visual-spatial abilities and deficits, also display different patterns of personality functioning. The mean PIC profiles of children, classified into Groups 1, 2, and 3 by their patterns of academic achievement, were compared in this study. Group 3 children obtained higher

mean PIC T score values than Group 1 and Group 2 children on all of the scales associated with the "personality deviance" and the "psychopathology-internalization" factors. However, the mean PIC profile scale differences between Group 1 and Group 3 were not as distinct as those contrasts between Group 2 and Group 3 children.

In general, the personality profiles of the Group 2 children were virtually identical to the normal subtype identified by Porter and Rourke. The Group 3 children, in contrast, were characterized in a manner similar to the second, emotionally disturbed subtype.

In a study designed to measure directly the social sensitivity of Group 2 and Group 3 children, Ozols and Rourke (1985) assessed the performance of these different subtypes on four tasks involving social perception. Subjects were required to give verbal and nonverbal responses to stimuli which were verbal and/or visual in nature. Group 2 children were generally superior to Group 3 children on tasks requiring a nonverbal response to either verbal or visual stimuli. In contrast, Group 3 children performed in a superior fashion to Group 2 children on tasks which required fairly complicated verbal responses to visual material. These results provide further evidence that Group 3 children excel on measures requiring verbal expression and do poorly on nonverbal tasks in general. Group 2 children exhibit the opposite pattern, with superior performance on

nonverbal tasks and poor performance on measures of linguistic ability. It is evident that different patterns of central processing abilities and deficits predispose a child to different patterns of academic performance, as well as to different patterns of socioemotional functioning.

### LEARNING DISABILITIES AND ADAPTIVE BEHAVIOUR FUNCTIONING

The assessment of adaptive behaviour functioning in learning disabled children has proceeded in a direction similar to the investigation of personality factors. The patterns of strengths and weaknesses exhibited by learning disabled children not only differentially affect their socioemotional functioning, but also influence their adaptive behaviour.

The adaptive functioning of learning disabled children with specific arithmetic disabilities has been described by Strang and Bourke (1985b). These (Group 3) youngsters display a particular pattern of central processing abilities and deficits as well as specific behavioural characteristics. Overall, these children have difficulties with the "perception, analysis, organization and synthesis of nonverbal information (introduced via the tactile and visual modalities)" (p. 307), as well as exhibiting psychomotor output and nonverbal problem-solving deficits.

Children who exhibit this particular pattern of neuropsychological deficiencies are generally not well-

adjusted socioemotionally and often have developed inappropriate social and general adaptational skills. Strang and Bourke (1985b) present a detailed description of the clinical, linguistic, psychoeducational, and socioemotional characteristics of Group 3 children. The overall adaptive picture suggested by the behaviour of these children is rather guarded. Their inappropriate nonverbal behaviours (e.g., a lack of facial and body expression and general awkwardness) and their inability to attend to, or to understand, the nonverbal gestures and communications of others contribute to extremely poor interpersonal relationships. These children do not develop better nonverbal communication skills since they use language exclusively as (a) a means of communicating in a situation (regardless of context), (b) a way of gathering new information, and (c) a way of maintaining contact with a listener.

In addition, the "hyperverbal" behaviour of Group 3 children may lead other people to believe that they are much brighter than is actually the case. The classroom teacher might overlook the arithmetical learning disabilities of such children because of their well-developed vocabularies and adequate reading and spelling skills. In contrast, dyslexic children's difficulties are far more likely to be noticed by educators who are sensitized to dealing with such disabilities.

The academic performance of Group 3 children is often overestimated. Their word-recognition skills tend to be well-developed; however, reading comprehension abilities are somewhat deficient in these children. Academic subjects, such as science, art, and physical education, may be difficult for these children, especially as they grow older and the subject material becomes more novel and complex. The adaptive difficulties many Group 3 children experience thus affect the academic, social, behavioural, and emotional aspects of their lives.

Long-term adaptive difficulties of central processing deficiencies. The adult outcomes of children with specific learning disabilities suggests that the prognosis for Group 3 children as they mature is very poor. Rourke, Young, Strang, and Russell (1985) compared the assessment findings of two individuals who underwent neuropsychological examinations as children and again as adults. These individuals had been identified as Group 2 and Group 3 subjects when they were assessed as children. The overall adaptive outcome of the Group 2 individual was more positive than that of the Group 3 individual, especially in terms of job placement and social relations.

Rourke et al. (1985) also examined the neuropsychological protocols of eight individuals seen for assessment as adults with presenting socioemotional difficulties. The abilities and deficits exhibited by this



group bore a striking resemblance to the patterns seen in Group 3 children. None of the eight persons selected had achieved positions commensurate with their academic qualifications and all exhibited social and emotional difficulties. Two individuals had even been diagnosed as schizophrenic during their adult lives. These results suggest that patterns of central processing deficits, which produce socioemotional as well as academic difficulties, affect the adaptive behaviour of learning disabled children well into adulthood.

A classic clinical picture of adults with symptomology quite similar to the Group 3 subjects has emerged in the literature. The case histories of 14 patients, who ranged in age from 11 to 42 years, were studied throughout a four-year period by Weintraub and Mesulam (1983). In these subjects, social difficulties, visual-spatial deficits, and neurological evidence of right-hemisphere cerebral dysfunction occurred together as distinguishing features. The 14 patients were given an extensive neuropsychological examination (Halstead-Reitan Battery), and 6 of the 14 subjects were further assessed on measures of the prosodic quality of their speech, maintenance of eye contact, and the use of gestures. The observations noted by Weintraub and Mesulam concerning these patients' academic deficiencies and talents, verbal versus nonverbal cognitive abilities, and interpersonal relationships are virtually identical to the

description of Group 3 children's adaptive behaviour by Strang and Bourke (1985b) .

This distinctive pattern of abilities and deficits has also been elaborated on by Wing (1981) in her clinical descriptions of patients diagnosed with Asperger's Syndrome. The 34 cases examined by Wing bear a striking resemblance to the adult Group 3 subjects studied by Rourke et al. (1985). In addition to having similar job placement and interpersonal relationship difficulties, these individuals were also at great risk for the development of psychiatric illnesses. The cases examined by Wing appear to be adult versions of the Group 3 subtype of learning disabled children. The results of these studies suggest that deficiencies of visual-spatial skills, directed attention, and modulation of affect may seriously impair the long-term adaptive functioning of individuals so affected.

#### SUMMARY .

The subtype approach to the classification of learning disabilities has expanded the scope of this field of investigation. The move away from a "single deficit" hypothesis to the concept of a heterogeneous learning disabled population represents considerable advancement in theory and research. The delineation of the specific learning problems of Group 3 children, and the pattern of socioemotional and adaptive behaviours associated with these

difficulties, has led to the development of better remediation strategies for these children [e.g., Strang & Bourke, 1985b].

The subtyping studies discussed in this review have used either clinical-inferential or statistical approaches to classifying learning disabled children into groups. The differences in the subtypes derived from clinical and statistical research are most likely the result of differences in the nature of the neuropsychological variables selected for classification. In this regard, subtype analysis has been most successful in identifying groups of children with auditory-verbal deficiencies versus nonverbal and conceptual difficulties. The direction of future research will likely be to clarify and consolidate contradictory observations and to confirm or reject the existing subtype patterns.

#### PURPOSE OF THIS STUDY

The purpose of this research was to describe and attempt to clarify the nature of the adaptive abilities and deficits of two subtypes (i.e., Group 1 and Group 3) of older learning disabled children who were classified according to their patterns of academic achievement on the Wide Range Achievement Test.

In this study, the two subtypes of children with learning disabilities were selected as follows. Children

who exhibited uniformly deficient reading, spelling, and arithmetic performances on the subtests of the WBAT constituted Group 1 subjects. Children who exhibited average or above average performances on the Reading and Spelling subtests of the WBAT, but who had deficient performances on the Arithmetic subtest constituted Group 3 subjects. These two groups were selected in accordance with previous studies utilizing the subtype framework (e.g., Bourke & Finlayson, 1978; Bourke & Strang, 1978).

Although Group 1 is composed of a more heterogeneous group of learning disabled children than is Group 2, it was expected that the performance of Group 1 would be quite similar to that of Group 2. For example, Bourke and Finlayson (1978) found that both Group 1 and Group 2 children exhibit deficient performances on measures of verbal and auditory-perceptual skills. Since Group 2 children were unavailable for this study, Group 1 children were used instead.

Adaptive behaviour measures. The Vineland Adaptive Behavior Scales (VABS; Sparrow, Balla, & Cicchetti, 1994) were used to obtain measures of the adaptive functioning of Group 1 and Group 3 children. The VABS are a revision of Edgar Doll's (1935, 1965) Vineland Social Maturity Scale and they reflect a considerable effort in modernizing Doll's scales to represent current views of adaptive behaviour.

The Vineland scales assess the personal and social sufficiency of individuals from birth to adulthood. Sparrow, Balla, and Cicchetti define and approach adaptive behaviour in the following manner:

1. Adaptive behaviour is age-related.
2. Adaptive behaviour is defined by the expectations or standards of other people.
3. Adaptive behaviour is defined by typical performance, not ability. (p. 6, Expanded Form Manual)

The Vineland is administered in a semi-structured interview with a parent or caregiver who is most familiar with an individual's adaptive abilities. This method of administration produces a valid measurement of the day-to-day activities of the individual that cannot be adequately measured through direct administration of tasks.

The Vineland consists of five domains important in adaptive behaviour: Communication (with receptive, expressive, and written subdomains), Daily Living Skills (personal, domestic, and community subdomains), Socialization (interpersonal relationships, play and leisure time, and coping skills subdomains), Motor Skills (gross and fine subdomains), and a Maladaptive Behaviour Scale. See Appendix A for descriptions of subdomain content.

### HYPOTHESES FOR THIS STUDY

This study compared and contrasted Group 1 children with Group 3 children on the five Vineland Domains: Communication, Daily Living Skills, Socialization, Motor Skills, and Maladaptive Behaviour. As well, group comparisons were made on the Adaptive Behaviour Composite and on subdomain scales within each Domain. The expected results for the Domain and subdomain comparisons are presented, followed by the rationale for these hypotheses.

It was predicted that Group 3 children would be superior to Group 1 children in communication abilities, and inferior to Group 1 children in daily living skills and socialization abilities. Similarly, it was expected that intragroup comparisons would reveal inferior communication abilities and superior daily living and socialization skills for Group 1 children. Group 3 children were expected to exhibit superior communication abilities and inferior daily living and socialization skills.

If any deficits among Group 1 or Group 3 subjects on the Motor Skills Domain scale were revealed, the motor skills of Group 3 children were expected to be relatively deficient compared to Group 1 children.

It was also predicted that Group 3 children would exhibit more maladaptive behaviours, especially on items involving withdrawal and internalizing behaviours. Group comparisons on the Adaptive Behaviour Composite scale were

expected to reveal that Group 3 is relatively deficient to Group 1 in overall adaptive functioning.

The hypotheses for the performance of Group 1 and Group 3 on the Domain scales are summarized as follows:

Domain

Communication	Group 3 > Group 1
Daily Living Skills	Group 1 > Group 3
Socialization	Group 1 > Group 3
Motor Skills	Group 1 > Group 3
Adaptive Behaviour Composite	Group 1 > Group 3
Maladaptive Behaviour	Group 3 > Group 1

Group comparisons on the subdomains within the Communication Domain were expected to reveal equivalent performances for Group 1 and Group 3 on the receptive subdomain. However, Group 3 was expected to be superior to Group 1 on both the expressive and the written subdomains.

Within the Daily Living Skills Domain, Group 1 was expected to be superior to Group 3 on the personal and community subdomains. Group 3 was predicted to be superior to Group 1 on the domestic subdomain.

Within the Socialization Domain, Group 1 was expected to be relatively superior to Group 3 on the interpersonal relationships, play and leisure time, and coping skills subdomains. The motor skills of Group 1 were expected to be superior to those of Group 3 on the gross and fine motor skills subdomains.

The hypotheses for the performance of Group 1 and Group 3 on the subdomain scales are summarized as follows:

Subdomain

Receptive	Group 1 = Group 3
Expressive	Group 3 > Group 1
Written	Group 3 > Group 1
Personal	Group 1 > Group 3
Domestic	Group 3 > Group 1
Community	Group 1 > Group 3
Interpersonal Relationships	Group 1 > Group 3
Play and Leisure Time	Group 1 > Group 3
Coping Skills	Group 1 > Group 3

RATIONALE FOR HYPOTHESES

Based on previous observations (e.g., Strang & Bourke, 1985b), it seemed reasonable to predict that the adjustment of Group 3 children to social relationships and daily routines would be poor. It was also expected that the extensive auditory-verbal deficiencies of Group 1 children should interfere with the communication abilities of these children.

The reported physical clumsiness and poor athletic ability of Group 3 children was expected to lower their scores on the Motor Skills Domain. However, this scale's low ceiling (i.e., the highest attainable age-level on the gross and fine motor skills subdomains is "above 5 years, 11



months") possibly masked any existing differences between Group 1 and Group 3 children.

On the Maladaptive Behaviour Domain, Group 3 children were expected to have more "internalized" problem behaviours (e.g., overly dependent, overly anxious, withdrawn and avoiding others, stubborn or sullen). This prediction was based on Strang and Bourke's (1985a) observations that Group 3 children were characterized on the PIC as evidencing internalized socioemotional disturbance.

The overall Adaptive Behaviour Composite scores were expected to be lower for Group 3 children than for Group 1 children as a result of the predicted inferior scores of Group 3 children on the Daily Living Skills and the Socialization Domains.

Within the Communication Domain, Group 1 children were expected to have difficulty with expressive and written communication skills relative to Group 3 children. It is assumed from previous research that Group 1 children have verbal and auditory-perceptual deficiencies. Group 1 children, therefore, are expected to perform poorly on items requiring the expression of ideas in more than one way, and describing stories and their plans in detail.

Group 1 children are expected to perform Vineland reading and writing tasks below age-appropriate levels. This hypothesis is derived from the observation that Group 1 children exhibit poor performance on the WRAT Reading and Spelling subtests.

It was also expected that Group 1 and Group 3 children would achieve equivalent scores on the receptive subdomain. The highest attainable age-equivalent score on this subdomain is 7 years, 10 months. Since older (9- to 14-year-old) Group 1 and Group 3 children are used in this study, it seems reasonable to expect that the listening and attending skills of these children are at or above the 7 year, 10 month level.

Within the Daily Living Skills Domain, Group 1 children were expected to perform personal hygiene tasks (e.g., washing hair, maintaining their health), domestic chores, and community skills (e.g., telling time, using the telephone) at age-appropriate levels. Group 3 children, however, were expected to exhibit inferior performance on personal care tasks and on community skills. As discussed by Strang and Bourke (1985b), Group 3 children are often unkempt in appearance and they may have difficulty doing simple tasks, such as tying shoelaces.

Group 3 children, however, were expected to be superior to Group 1 children in the domestic skill areas (e.g., cooking, cleaning, making the bed) of the Daily Living Skills Domain. Strang and Bourke (1985b) have indicated that Group 3 children are seen as highly dependent, especially on their mothers, for feedback and direction. These outstanding dependency needs sometimes become reinforcing for the parent and may hinder the child's

acquisition of independent living skills. The close ties Group 3 children appear to maintain with the home may result in their performance of more supervised household-related tasks than seen with Group 1 children.

Within the Socialization Domain, Group 3 children were expected to have significant adaptive problems in interpersonal relationships, play and leisure activities, and coping skills as compared to Group 1 children. The social difficulties of Group 3 children are thought to be quite outstanding. These children often have difficulty in attending to, and understanding, the nonverbal gestures and communications of other children (Strang & Bourke, 1985b). Therefore, Group 3 children are expected to be deficient in the areas of social communication, friendship, cooperative interactions, and group activities. As well, Group 3 children were not expected to participate in group games, extracurricular and nonschool activities due to their general awkwardness and the socially inappropriate behaviours they tend to display.

It was also expected that Group 3 children would have fewer coping skills (e.g., being sensitive to others, controlling impulses, apologizing, borrowing and returning items) given the general insensitivity they often demonstrate concerning how other people feel and their reduced ability to benefit from contextual cues in conversation.

## Chapter II

### METHOD

#### SUBJECTS

The subjects in this study were selected from a larger population of children who received neuropsychological assessments because of suspected cerebral dysfunction contributing to their learning or perceptual difficulties. Each subject was administered a standardized assessment by technicians trained specifically for that purpose. The tests administered to these subjects cover a wide range of academic, sensory, motor, psychomotor, tactile, auditory-verbal, visual-perceptual, conceptual, and nonverbal problem-solving skills (see Bourke, 1975, for a discussion of test selection).

Subject screening criteria. Subjects for this study were screened according to McCarthy and McCarthy's (1969) definition of learning disabilities. In this regard, children with: (a) uncorrected visual acuity difficulties, (b) any evidence of cultural, educational, and/or environmental deprivation, and (c) any known medical or neurological condition affecting their development were excluded from this study. This information was obtained from the responses of the child's parent on a Parent

Questionnaire as well as in a pretest interview with one or both parents.

Children with any evidence of impaired auditory acuity were excluded from this study. Hearing difficulties were defined as a loss of 30 decibels or greater with either ear at any frequency within the speech range (250 to 4,000) on the Sweep Hearing Test. This test was administered during the child's neuropsychological assessment.

All children involved in this study had attended school regularly since the age of 6 years. This criterion was necessary to rule out any educational deprivation among the subjects.

It was also necessary in this study to exclude subjects who spoke a language other than English at home. The parents of such children may experience difficulty assessing and describing their child's communication abilities since the Vineland interview was conducted in English only.

Group selection criteria. All subjects in this study ranged in age from 9(0) to 14(11) years and their Full Scale IQ scores on the WISC or WISC-R ranged between 81 and 119.

Group 1 was composed of 10 subjects whose U.S grade-equivalent scores on the WRAT Reading, Spelling, and Arithmetic subtests were at least 2.0 years below their expected grade placement. As well, the WRAT Reading, Spelling, and Arithmetic centile scores did not exceed 25 for subjects in Group 1.

Group 3 was composed of 10 subjects whose U.S. grade-equivalent scores on the WRAT Reading and Spelling subtests exceeded their WRAT Arithmetic grade-equivalent scores by at least 1.8 years. As well, the WRAT Reading and Spelling centile scores were above 45 and the WRAT Arithmetic centile scores did not exceed 25 for subjects in Group 3.

The subject selection criteria are summarized in Table 1 and the mean group performances on the Reading, Spelling, and Arithmetic subtests of the WRAT are presented in Figure 1.

Children in Group 1 and Group 3 were equated for age and Full Scale IQ on the WISC or WISC-R. Results of a  $t$  test of mean group differences indicated that Groups 1 and 3 did not differ significantly from one another in age ( $t = 0.16$ ,  $p > .10$ ) or Full Scale IQ ( $t = 0.97$ ,  $p > .10$ ).

In addition,  $t$  tests of mean group performances on the three WRAT subtests indicated that there were highly significant differences. Group 3 performed in a superior fashion to Group 1 on the Reading and Spelling subtests. On the Arithmetic subtest, however, the performances of Group 1 and Group 3 children did not differ. Group performances on these selection variables are presented in Table 2.

Dependent measures. The dependent measures in this study were obtained from the Vineland interviews conducted during the pretest parent interview with parents of Group 1 and Group 3 children. The dependent variables in this study

Table 1

Subject Selection CriteriaAll Subjects

1. Between 108 and 179 months of age;
2. WISC or WISC-R Full Scale IQ between 81 and 119;
3. No evidence of uncorrected vision difficulties;
4. No evidence of cultural, environmental, or educational deprivation;
5. No known medical or neurological condition interfering with development;
6. No evidence of auditory acuity difficulties;
7. English spoken in the home.

Group 1 Subjects (n = 10)

- (a) Met criteria 1 to 7 above;
- (b) Obtained U.S. grade-equivalent scores on the WRAT Reading, Spelling, and Arithmetic subtests at least 2.0 years below their expected grade placement;
- (c) Obtained WRAT Reading, Spelling, and Arithmetic centile scores less than or equal to 25.

Group 3 Subjects (n = 10)

- (a) Met criteria 1 to 7 above;
- (b) Obtained WRAT Reading and Spelling grade-equivalent scores at least 1.8 years above their Arithmetic grade-equivalent scores;
- (c) Obtained WRAT Reading and Spelling centile scores greater than or equal to 45;
- (d) Obtained WRAT Arithmetic centile scores less than or equal to 25.

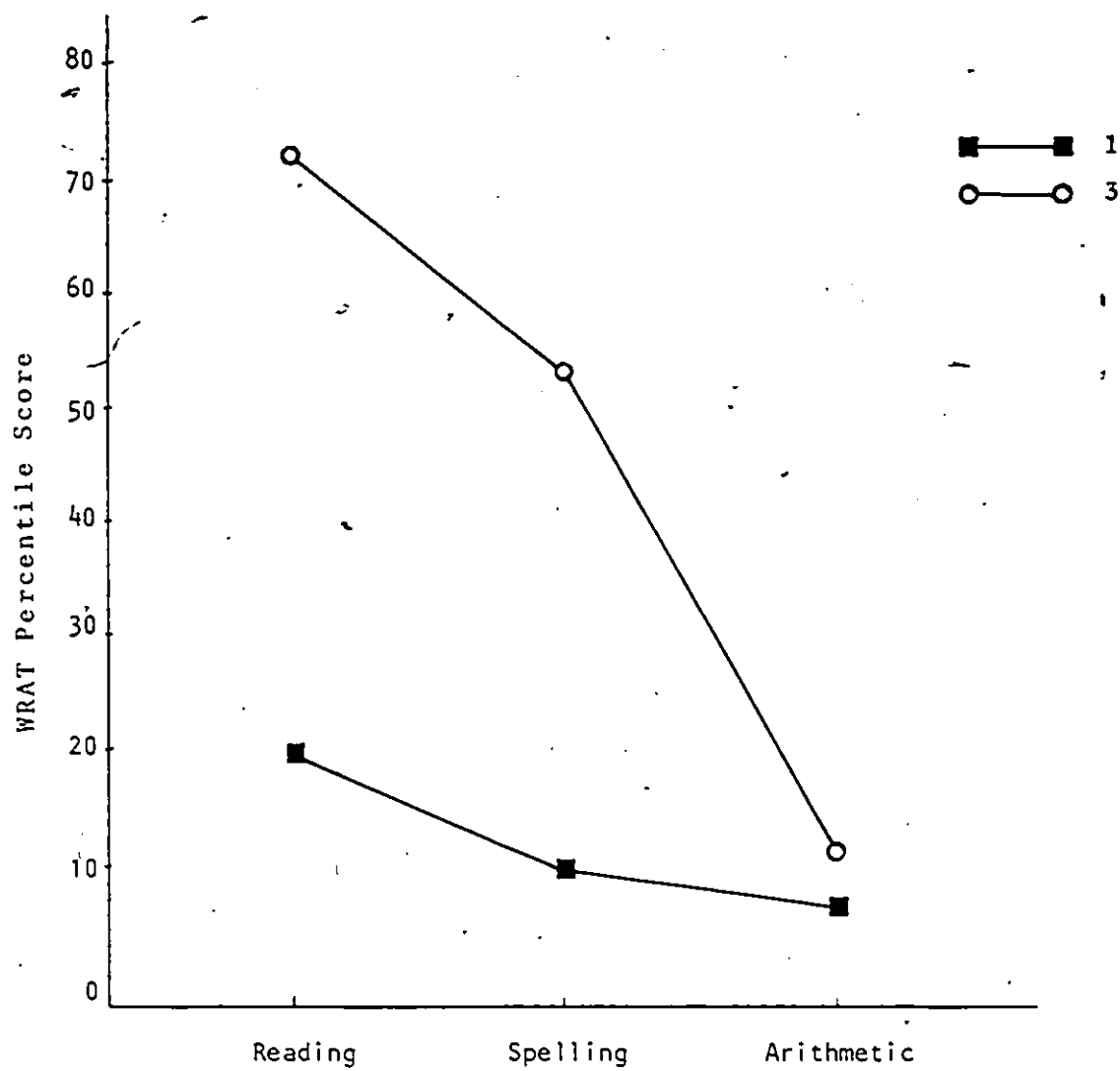


Figure 1. Mean group performance on WRAT Reading, Spelling, and Arithmetic subtests.



Table 2  
Means, Standard Deviations, and t test Results  
On Selection Variables (Groups 1 and 3)

Variable	Group 1		Group 3		<u>t</u> value	
Sex	M	8	M	6		
	F	2	F	4		
Age (months)	M	145.50		146.80	0.16	n.s.
	SD	20.90		16.32		
WISC/WISC-R	M	94.20		98.40	0.97	n.s.
Full Scale IQ	SD	10.48		8.80		
WRAT Reading	M	15.90		73.60	11.63	.0001 *
(centile)	SD	8.50		13.23		
WRAT Spelling	M	9.50		62.80	11.79	.0001 *
(centile)	SD	8.48		11.50		
WRAT Arithmetic	M	7.80		10.60	1.16	n.s.
(centile)	SD	5.51		5.27		

\* p < .01

were as follows: (a) the standard scores derived for the subjects on each of the Domain scales (i.e., Communication, Daily Living Skills, Socialization, Motor Skills, and Adaptive Behaviour Composite), (b) the age-equivalent scores (in months) derived for the subjects on each of the Subdomain scales (i.e., receptive, expressive, written, personal, domestic, community, interpersonal relationships, play and leisure time, and coping skills), and (c) the total number of maladaptive behaviours indicated for each subject on part A of the Maladaptive Behaviour Domain scale.

#### STATISTICAL ANALYSES

A one-way multivariate analysis of variance (MANOVA) with two levels of the independent variable (Group: 1, 3) was performed on the five Domain dependent variables (Domain: Communication, Daily Living Skills, Socialization, Motor Skills, Adaptive Behaviour Composite). This procedure is essentially a multivariate  $t$  test (Hotelling's  $T^2$ ) since there are only two levels of the independent variable. One-way analyses of variance (ANOVAS or  $t$  tests) were also performed to determine significant pairwise comparisons.

A one-way MANOVA with two levels of the independent variable (Group: 1, 3) was performed on the nine subdomain dependent variables (as described above). One-way ANOVAS ( $t$  tests) were performed to determine significant pairwise comparisons.

Intragroup pairwise comparisons on Domain scales were also conducted using t tests. In addition, a t test was performed on the mean number of maladaptive behaviours for each group on the Maladaptive Behaviour Domain scale.

### Chapter III

#### RESULTS

The major analyses investigating the performance of Group 1 and Group 3 on the three sets of dependent variable are presented. The data in this study were analyzed using the Statistical Analysis System developed by the SAS Institute, Inc., (1982).

#### INVESTIGATION OF HYPOTHESES

Vineland Domain measures. The means, standard deviations, and directions of effect obtained by the two groups on the Domain measures (i.e., Communication, Daily Living Skills, Socialization, Motor Skills, and Adaptive Behaviour Composite) are presented in Table 3. Scores on the Motor Skills Domain were not included in the statistical analysis since all children in both groups attained the highest possible scores on this scale.

A one-way multivariate analysis of variance (MANOVA) for Group across the four Domain measures (Communication, Daily Living Skills, Socialization, & Adaptive Behaviour Composite) approached significance at the .05 level ( $F(4, 15) = 2.81, p < .07$ ).

Table 3

Means, Standard Deviations, and Directions of Effect for  
Group Performance on Vineland Domain Measures

Variable		Group 1	Group 3	Direction of Effect
Communication	M	77.10	90.00	1 < 3
	SD	8.67	10.10	
Daily Living Skills	M	84.30	83.90	3 < 1
	SD	9.33	8.23	
Socialization	M	82.40	89.00	1 < 3
	SD	10.54	12.50	
Motor Skills	M	113.00	113.00	1 = 3
	SD	0	0	
Adaptive Behaviour Composite	M	76.50	83.50	1 < 3
	SD	9.10	9.37	

A one-way analysis of variance, (ANOVA) yielded a highly significant effect for Group on the communication variable ( $F(1,18) = 9.39, p < .007$ ). The observed direction of effect was consistent with that predicted, as the Group 3 children performed in a superior manner to the Group 1 children on this scale. No other Group comparisons on the Domain variables were statistically significant at the .05 level.

A quantitative index of the sensitivity of each Domain scale was obtained by calculating power values. Power refers to the probability of rejecting the null hypothesis when an alternative hypothesis is true. Power is also defined in terms of the probability of making a type II error (Keppel, 1973). The power value of 0.80 obtained for the Communication Domain indicates that this scale was fairly sensitive. In contrast, the power values of the Daily Living Skills, Socialization, and Adaptive Behaviour Composite Domains were quite low (i.e.,  $< 0.30$ ). It is possible that a type II error (i.e., accepting the null hypothesis when the alternative is true) was made on these latter Domain scales given their low power values. The probability of a type II error would also increase if the Motor Skills Domain values were included in the data analysis. As illustrated in Table 3, both groups achieved the same maximum scores on this scale which serves to enhance the similarities of these groups.

A summary of the MANOVA, ANOVA, and group mean comparison results is presented in Table 4.

The group means for these dependent variables were derived from standard scores with a mean of 100 and a standard deviation of 15. Thus, good performance on the Domain measures is represented by higher scores. The mean group standard scores on the Domain variables are presented in Figure 2.

In summary, these results provide support for the prediction that the communication skills of Group 3 children are superior to those of Group 1 children.

Intragroup comparisons among Domain means were carried out to compare the mean scores on each Domain measure within each group. These comparisons test for significant differences between mean Domain scores within each group and reveal the group's pattern of performance across the dependent measures. It was hypothesized that Group 1 children would have inferior communication abilities with relatively superior daily living and socialization skills, while Group 3 children were expected to have superior communication abilities with relatively inferior daily living and socialization skills. The results of the comparisons using t tests are presented in Table 5, and reveal that statistically significant Domain differences for Group 1 were found for Daily Living Skills and Communication, and for Daily Living Skills and Adaptive

Table 4

Summary of ANCOVA and MANOVA Results for  
Vineland Domain Measures

Variable	Sum of Squares	df	F value	p	
Communication	832.05	1	9.39	.007	*
error	1594.90	18			
Daily Living Skills	0.80	1	0.01	.92	n.s.
error	1393.00	18			
Socialization	217.80	1	1.63	.22	n.s.
error	2406.40	18			
Adaptive Behaviour	266.45	1	3.12	.09	n.s.
Composite error	1536.10	18			
MANOVA		4 15	2.81	.06	n.s.

\*  $p < .05$

Note: The Hotelling-Lawley Trace was used for the  
MANOVA F. test.



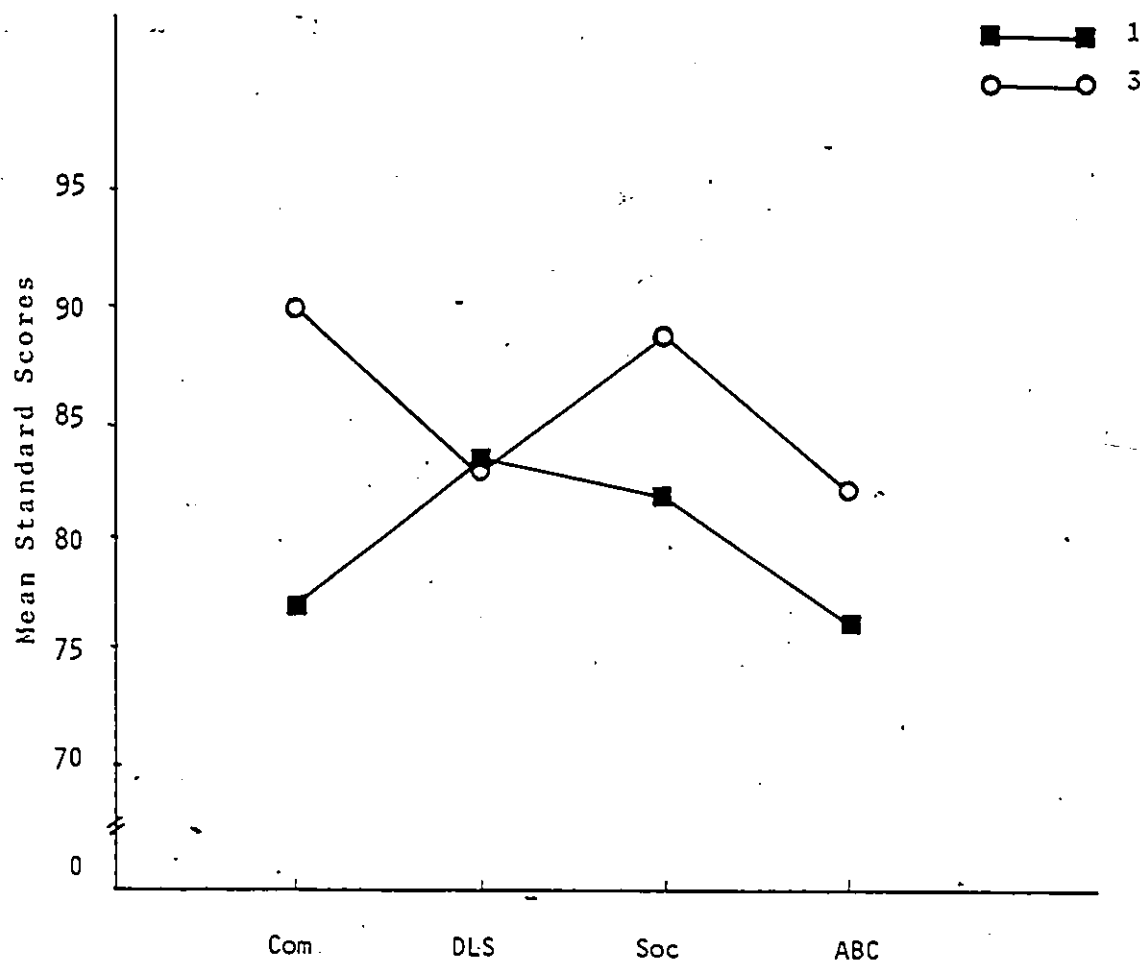


Figure 2. Mean standard scores for each group on the Vineland Domain measures. Abbreviations: Com, Communication; DLS, Daily Living Skills; Soc, Socialization; ABC, Adaptive Behavior Composite.

Behaviour Composite. There were no statistically significant Domain differences revealed for Group 3. The direction of effects obtained for Group 1 was contrary to that hypothesized.

Vineland Subdomain measures. The means, standard deviations, and directions of effect obtained by Group 1 and Group 3 on the subdomain measures are presented in Table 6.

A one-way MANOVA for Group across the nine subdomain measures did not yield a statistically significant difference at the .05 level ( $F(9,10) = 1.48, p < .10$ ).

A one-way ANOVA yielded a significant effect for Group on the Written subdomain ( $F(1,18) = 8.56, p < .01$ ). The observed direction of effect was consistent with that predicted, as the Group 3 children performed in a superior manner to the Group 1 children on this scale. No other Group comparisons on the subdomain variables were statistically significant at the .05 level. However, the nonsignificant result obtained for the receptive subdomain was consistent with that predicted.

An analysis of power values for the subdomain scales indicated that there is a large probability that a type II error was made on all scales except the written subdomain. The value of power for the written subdomain was 0.72, in contrast to power values of  $\leq 0.30$  for the other subdomains.

A summary of the ANOVA, MANOVA, and group mean comparison results is presented in Table 7.

Table 5

## Intragroup Comparisons Among Vineland Domain Measures

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Domains Compared	Group	df	t value
<hr/>			
Communication vs.	1	18	1.79 *
Daily Living Skills	3	18	1.48
Communication vs.	1	18	1.23
Socialization	3	18	0.20
Communication vs.	1	18	0.23
Adaptive Behaviour Composite	3	18	1.49
Daily Living Skills vs.	1	18	0.43
Socialization	3	18	1.08
Daily Living Skills vs.	1	18	1.96 *
Adaptive Behaviour Composite	3	18	0.10
Socialization vs.	1	18	1.41
Adaptive Behaviour Composite	3	18	1.11

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\*  $p < .05$

Table 6

Means, Standard Deviations, and Directions of Effect for  
Group Performance on Vineland Subdomain Measures

Variable		Group 1	Group 3	Direction of Effect
Receptive	M	73.40	79.00	1 < 3
	SD	22.50	19.37	
Expressive	M	100.60	108.20	1 < 3
	SD	14.54	31.27	
Written	M	111.20	137.80	1 < 3
	SD	15.32	24.32	
Personal	M	121.20	122.80	1 < 3
	SD	29.88	29.76	
Domestic	M	127.60	127.50	3 < 1
	SD	18.20	24.38	
Community	M	120.00	117.20	3 < 1
	SD	32.01	17.79	
Interpersonal Relationships	M	109.80	122.60	1 < 3
	SD	32.47	39.97	
Play and Leisure Time	M	101.50	112.70	1 < 3
	SD	24.08	42.64	
Coping Skills	M	124.20	145.00	1 < 3
	SD	36.63	51.34	

Table 7

Summary of ANOVA and MANOVA Results for  
Vineland Subdomain Measures

Variable		Sum of Squares	df	F value	p	
Receptive		156.80	1	0.36	.56	n.s.
	error	7932.40	18			
Expressive		288.80	1	0.49	.49	n.s.
	error	10702.00	18			
Written		3537.80	1	8.56	.009	*
	error	7435.20	18			
Personal		12.80	1	0.01	.91	n.s.
	error	16005.20	18			
Domestic		0.05	1	0.00	.99	n.s.
	error	8328.90	18			
Community		39.20	1	0.06	.81	n.s.
	error	12069.60	18			
Interpersonal Relationships		819.20	1	0.62	.44	n.s.
	error	23868.00	18			
Play and Leisure Time		627.20	1	0.52	.48	n.s.
	error	21584.60	18			
Coping Skills		2163.20	1	1.09	.31	n.s.
	error	35799.60	18			
MANOVA			9 10	1.09	.31	n.s.

\*  $p < .05$

Note: The Hotelling-Lawley Trace was used for the  
MANOVA F test.

The group means on these dependent variables were age-equivalent scores converted from years/months to months of age. The mean group age-equivalent scores on the subdomain variables are presented in Figure 3.

In summary, these results provide support for the prediction that the written skills of Group 3 children are superior to those of Group 1 children.

In an effort to clarify the nature of the results in this study, the Domain and subdomain scores of Group 1 and Group 3 children were contrasted with the scores of the Vineland normative sample. Comparisons of the two groups with the 12 year, 2 months old normative group were conducted for the subdomain scales. This analysis was possible since the mean age of Group 1 children was 12 years, 2 months, and the mean age of Group 3 children was 12 years, 3 months.

Figure 4 illustrates the performance of Group 1 and Group 3 children on the Domain measures relative to the average standard score of 100 (solid line). Both groups exhibit below-average scores; however, Group 1 children are particularly deficient with scores on each Domain scale between one and two standard deviations below the mean of 100 (dotted line). Group 1 children thus appear to be relatively deficient, compared to the normative sample, in all areas of adaptive behaviour. Group 3 children perform in the average range on the Communication and the

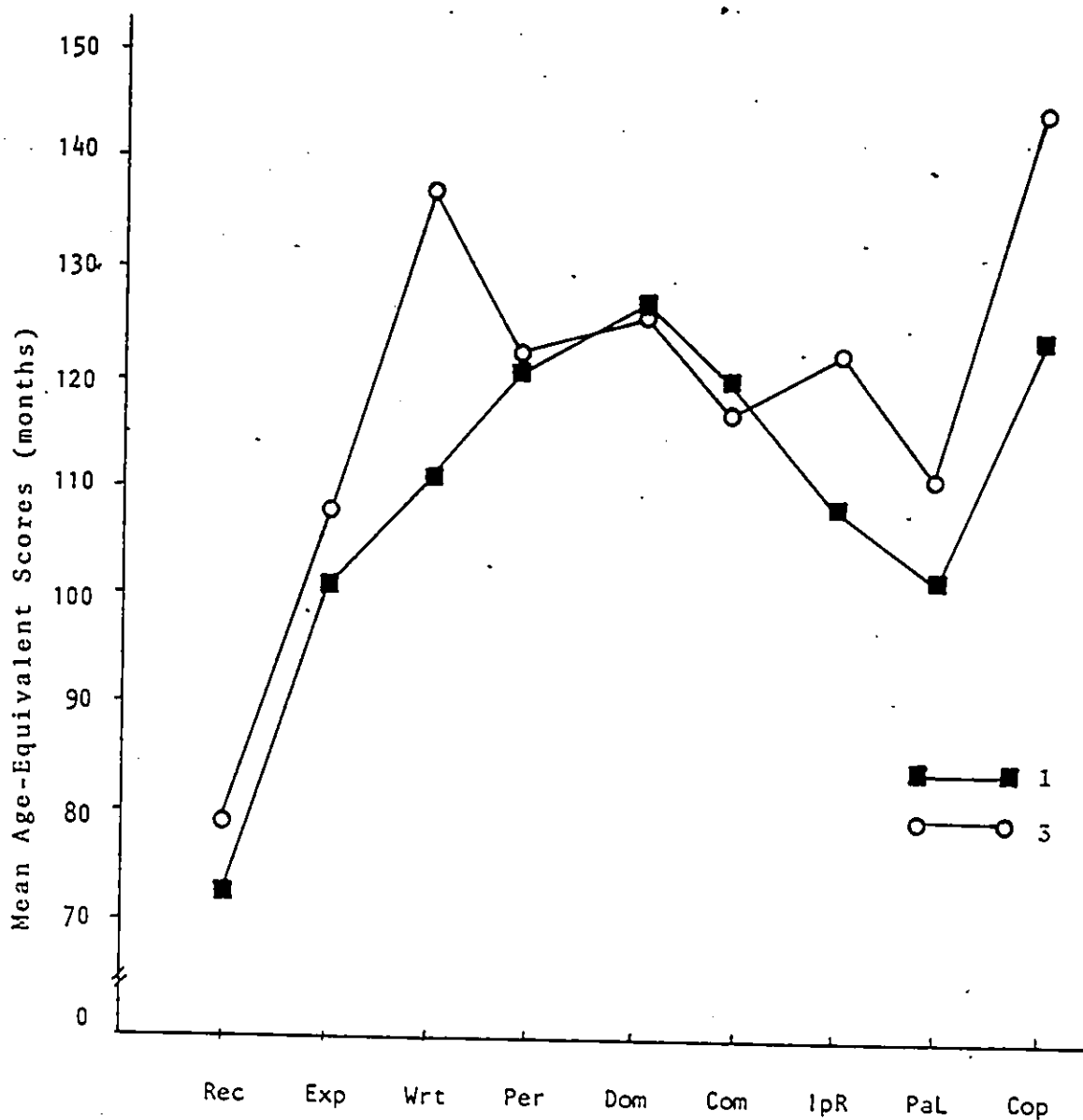


Figure 3. Mean age-equivalent scores in months for each group on the Vineland Subdomain measures. Abbreviations: Rec, Receptive; Exp, Expressive; Wrt, Written; Per, Personal; Dom, Domestic; Com, Community; IpR, Interpersonal Relationships; PaL, Play and Leisure Time; Cop, Coping Skills.

Socialization Domains, although they are somewhat deficient on the Daily Living Skills measure of adaptive behaviour.

The performance of Group 1 and Group 3 children on the subdomain scales is presented in Figure 5. The mean age-equivalent scores, in months, of both groups are contrasted with the 12 year, 2 month old (146 months) Vineland normative sample (solid line). The highest attainable scores for the normative group on the receptive and expressive subdomains are 94 and 135 months, respectively. The standard errors of measurement for the normative group on each subdomain (receptive excluded) are also illustrated in Figure 5.

Group 1 children exhibit a pattern of relatively deficient age-equivalent scores on all subdomain scales compared to the normative group. With the exceptions of the written and coping skills subdomains, Group 3 children also perform below age expectation on the subdomain scales.

The nonsignificant result obtained for the receptive subdomain takes on a different meaning when the performance of both groups is contrasted with the norms. It was hypothesized that Group 1 and Group 3 children would obtain equivalent scores on this subdomain. The highest attainable age-equivalent score they were expected to achieve was 7 years, 10 months (94 months). As seen in Table 6 and Figure 5, the actual mean score obtained by Group 1 children was 73.4 months, while Group 3 children obtained a mean score of



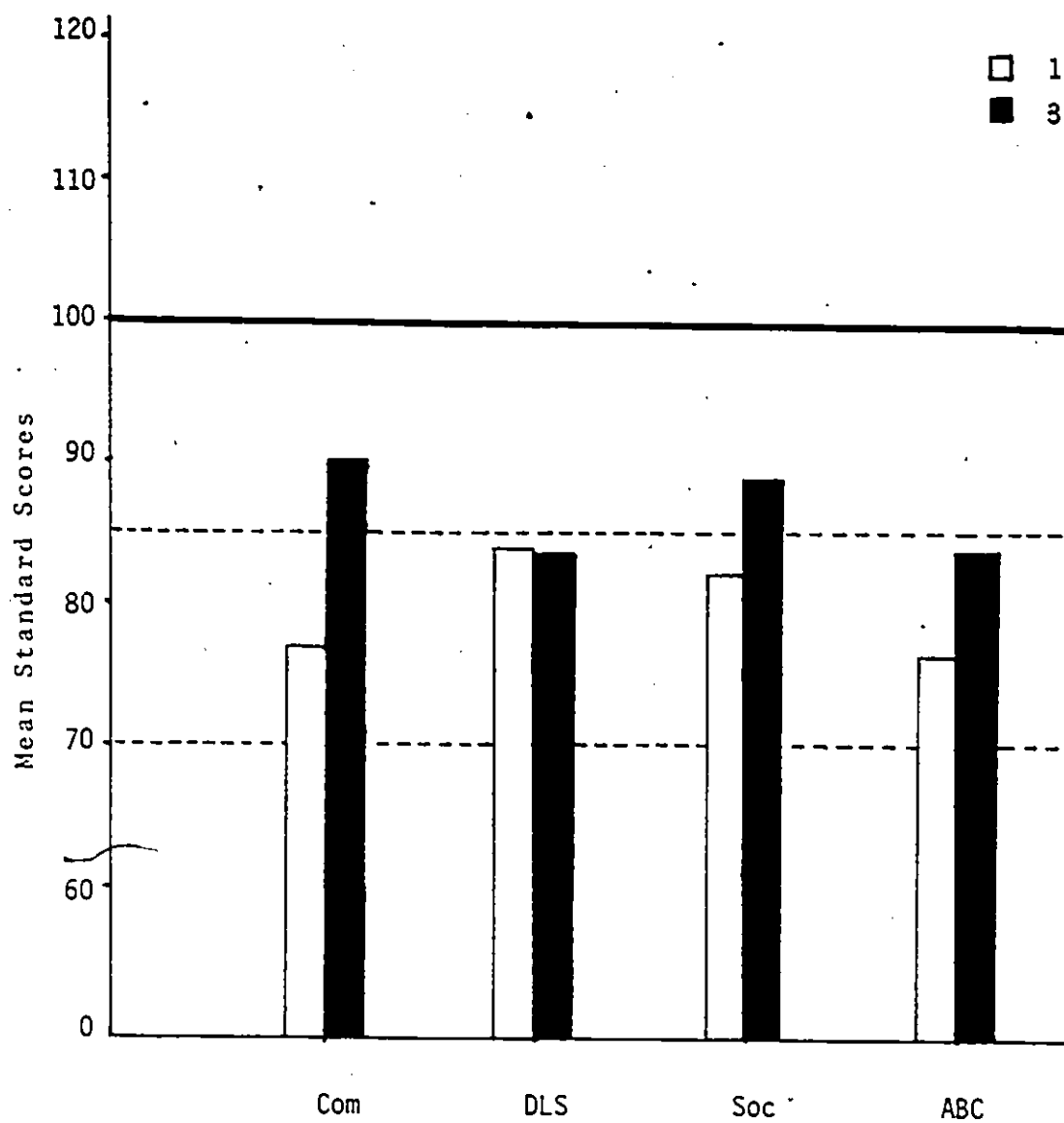


Figure 4. Mean standard scores for each group on the Vineland Domain measures compared to the normative sample.

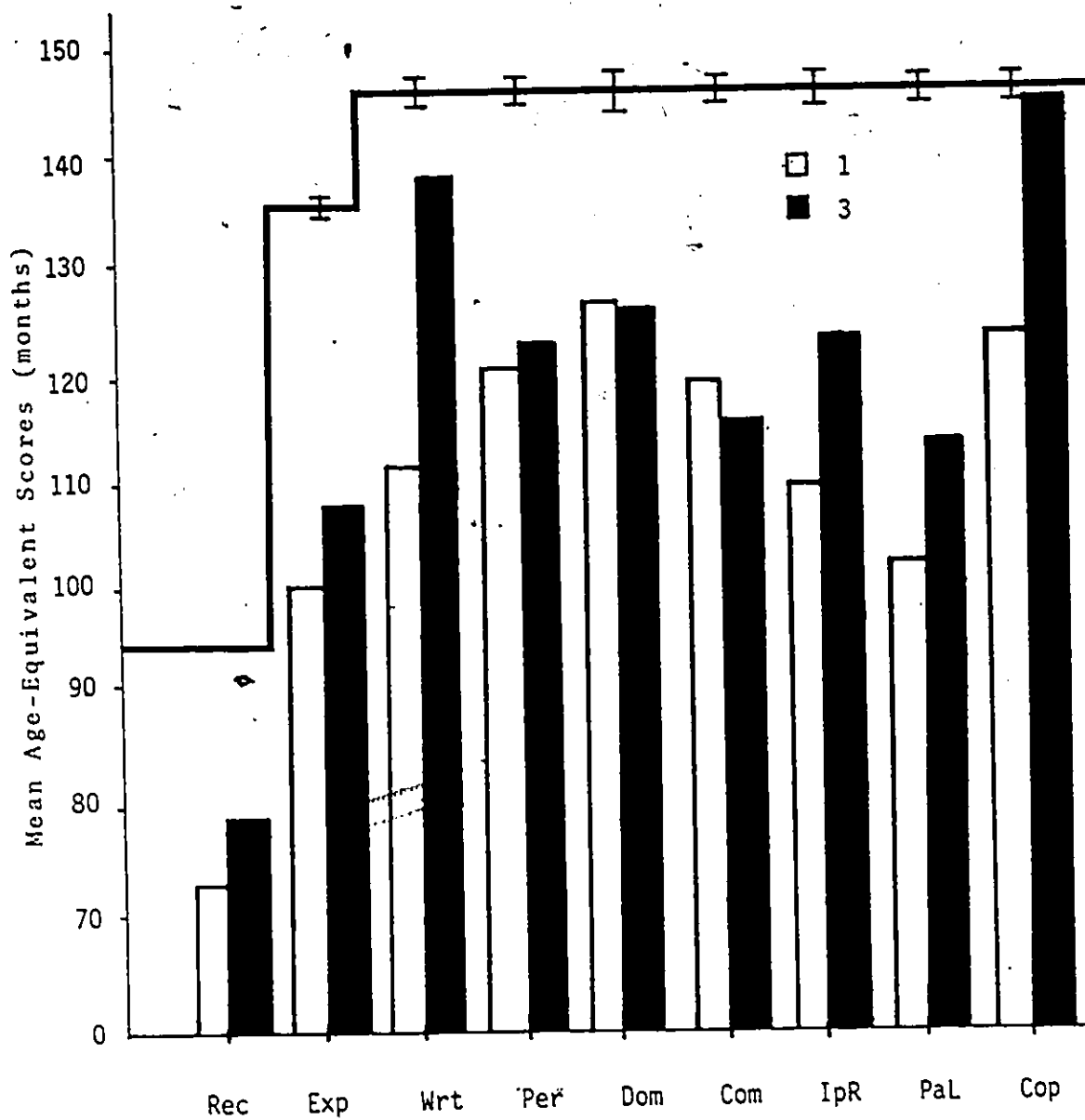


Figure 5. Mean age-equivalent scores in months for each group compared to the normative sample (for age 12 years, 2 months) on the Vineland Subdomain measures.

79 months. Although the two groups did not differ significantly from each other, it is evident that Group 1 and Group 3 children exhibit deficient receptive communication skills compared to the 12 year old normative sample.

The performance of Group 1 and Group 3 children on the expressive subdomain, compared to the norms, also alters the meaning of the nonsignificant result for this scale. It was expected that Group 3 would perform in a superior manner to Group 1 on this subdomain. Inspection of Table 6 and Figure 5 indicates that both groups performed well below the expected age-equivalent score of 11 years, 3 months (135 months). Specifically, Group 1 children obtained a mean score of 100.6 months while Group 3 children obtained a mean score of 108.2 months. Since both groups were inferior to the norms, it is possible that the hypothesis for the expressive subdomain was not adequately tested.

Vineland Maladaptive Behaviour Scale measure. The mean scores obtained on the Maladaptive Behaviour scale were 6.9 (SD = 3.54) for Group 1 children and 12.7 (SD = 5.60) for Group 3 children. A  $t$  test of mean-group differences revealed that Group 3 children exhibited significantly more maladaptive behaviours than Group 1 children ( $t(18) = 2.78$ ,  $p < .01$ ).

The range of scores on the Maladaptive Behaviour scale is from 0 to 54. These scores are divided into three

classifications: Nonsignificant, intermediate, and significant. The Vineland norms for the 12-13 year age range indicate that scores of 0-4 fall in the nonsignificant category, while scores of 5-11 and 12-54 are classified as intermediate and significant, respectively.

Figure 6 illustrates the distribution of Group 1 and Group 3 subjects' raw scores on the Maladaptive Behaviour scale. The majority of Group 1 subjects' scores are clustered in the intermediate range of maladaptive behaviours. In contrast, half of the Group 3 subjects' scores are clustered at the upper end of the intermediate range, while the remaining scores are scattered within the significant range.

A comparison of the normative scores with the mean scores of Group 1 and Group 3 children reveals that Group 1 children obtain an average score within the intermediate range. Group 3 children, however, obtain an average score within the significant range of maladaptive behaviour.

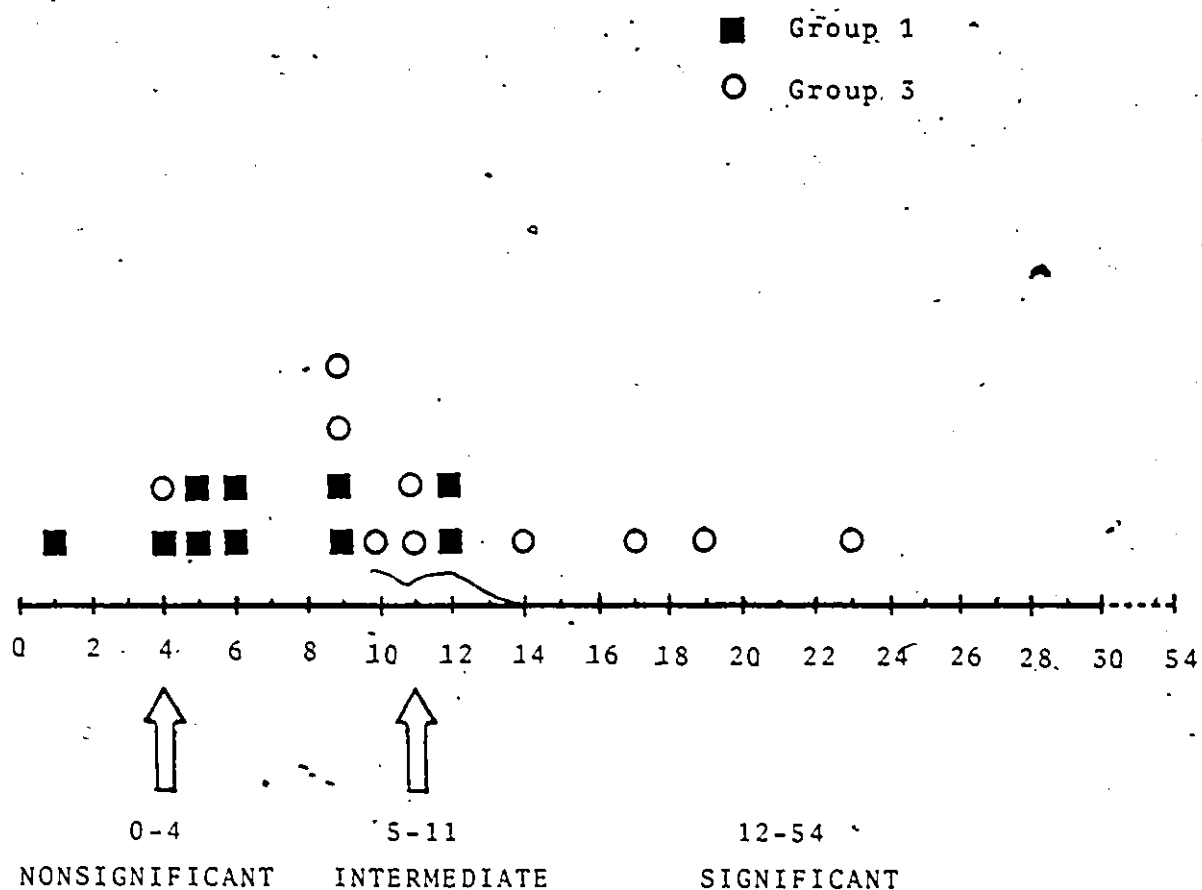


Figure 6. Distribution of Group 1 and Group 3 subjects according to raw scores on the Maladaptive Behavior Scale (values are the number of maladaptive behaviours).

## Chapter IV

### DISCUSSION

The principal purpose of this study was to investigate whether two groups of learning disabled children, classified according to their patterns of academic achievement, would differ in their performance on several measures of adaptive behaviour. Earlier studies had found significant group differences on neuropsychological variables with older (9- to 14-year-old) learning disabled children (Rourke & Finlayson, 1978; Rourke & Strang, 1978; Strang & Rourke, 1983), and with younger (7- and 8-year-old) learning disabled children (Ozols, 1984). As well, differences between groups of learning disabled children have been found on personality measures (Strang & Rourke, 1985a). The present study was designed to determine if there are differences among groups of 9- to 14-year-old learning disabled children, who were classified in a similar manner, on other measures of adaptive abilities.

A summary of the results obtained on the three sets of dependent variables in this study is presented, followed by an interpretation of the results in light of previous research findings and the content of the Vineland measures. The theoretical implications of the results are discussed

next, followed by possible reasons for nonsignificant findings and directions for future research in this area.

### SUMMARY OF RESULTS

Two groups of 9- to 14-year-old learning disabled children were established in the following manner: (1) children in Group 1 presented evenly deficient performances on the Reading, Spelling, and Arithmetic subtests of the Wide Range Achievement Test, and (2) children in Group 3 exhibited average or above-average performances on the Reading and Spelling subtests, but performed in a significantly inferior manner on the Arithmetic subtest. Groups 1 and 3 did not differ significantly in their level of performance on the Arithmetic subtest.

It was hypothesized that Group 1 children would perform in an inferior manner to Group 3 children on the Communication Domain and in a superior manner to Group 3 children on the Daily Living Skills, Socialization, and Adaptive Behaviour Composite Domains. In addition, it was predicted that intragroup comparisons would reveal inferior communication abilities with superior daily living and socialization skills for Group 1 children, and superior communication abilities with inferior daily living and socialization skills for Group 3 children. The hypothesis concerning the Motor Skills Domain was not evaluated as both groups attained the highest possible score on this scale.

These hypotheses were partially supported, as a significant group difference was found in the predicted direction on the Communication Domain measure.

Secondly, it was hypothesized that Group 1 children would perform in an equivalent manner to Group 3 children on the receptive subdomain, and in an inferior manner to Group 3 children on both the expressive and written subdomains of the Communication Domain. It was also expected that Group 1 would perform in a superior manner to Group 3 on the personal and community subdomains of the Daily Living Skills Domain, and also on the interpersonal relationships, play and leisure time, and coping skills subdomains of the Socialization Domain. Group 3 children were expected to perform in a superior manner to Group 1 children on the domestic subdomain of the Daily Living Skills Domain. The hypotheses concerning the gross and fine motor skill subdomains of the Motor Skills Domain were not evaluated as both groups attained the highest possible scores on these scales.

Only two hypotheses were supported by the results, as both Group 1 and Group 3 performed equally well on the receptive subdomain and Group 3 performed in a superior manner to Group 1 on the written subdomain. However, the levels of performance for Group 1 and Group 3 children on the receptive subdomain were quite deficient compared to the normative sample.



Thirdly, it was hypothesized that Group 3 children would have more maladaptive behaviours on the Maladaptive Behaviour Domain. The results supported this hypothesis.

#### INTERPRETATION OF RESULTS

The superior performance of Group 3 children on the Communication Domain of the Vineland provides partial support for the notion that this subtype of learning disabled children tends to have well-developed auditory-verbal and linguistic processing abilities. The two groups differed significantly only on the written subdomain of the Communication Domain, however, with Group 3 performing in a superior manner to Group 1 children. The Group 3 children's level of performance on the written subdomain was also nearly equivalent to the performance of the normative sample. The skills required to perform well on the written subdomain of the Vineland include the following items: (a) using reading materials (i.e., a dictionary, the table of contents, and the index in reading materials), and (b) doing written tasks (i.e., writing notes, letters, and reports).

It is significant to recall Strang and Bourke's (1985b) observations that Group 3 children perform some aspects of written work poorly. These children (especially at the older ages) are able to write words neatly and to produce a large amount of written work; however, their stories often lack conciseness and meaning. The written subdomain of the

Vineland, however, does not appear to assess the qualitative aspects of these children's handwriting abilities. Instead, the scale measures the volume of written material produced (e.g., a full score is obtained on the "writes reports or compositions" item if the child is able to write three reports, each at least one page in length). Given the Vineland's relative insensitivity to many aspects of written communication, it would appear that Group 3 children's ability in this area may be overestimated by this scale.

Other indications that the Vineland scales measure skills and abilities different from those tapped by neuropsychological tests are found in the results of the two groups on the expressive subdomain scale. The performances of Group 1 and Group 3 children were not significantly different, with an average age-equivalent score of approximately 8 years for Group 1 children and 9 years for Group 3 children. As noted previously, the mean performance of Group 3 children was approximately 2 years below age expectation.

Previous studies have indicated that Group 3 children have well-developed vocabularies, and that they are superior to Group 1 children on most measures of verbal and auditory-perceptual skills (Strang & Bourke, 1985b; Bourke & Finlayson, 1978). Group 3 children, however, did not evidence superiority in expressive language skills on the Vineland. This finding may be partially explained by the content of the items in this scale.

The relevant items for 9- to 14-year-old children on the expressive subdomain scale generally involve the expression of complex ideas (i.e., expressing ideas in more than one way, giving complex directions to others, and having realistic long-range goals and describing in detail plans to achieve them). Since items on the expressive subdomain scale require a concise and detailed manner of responding, it is not surprising that Group 3 children, who often have a tangential quality to their speech patterns (Strang & Rourke, 1985b), are unable to obtain superior scores.

As discussed previously, the mean performances of Group 1 and Group 3 children on the receptive subdomain were approximately 1 year below the expected age-equivalent score of 7 years, 10 months. Thus, Group 1 and Group 3 children exhibit substantial difficulties in receptive skill areas.

The Vineland receptive subdomain scale includes items such as following instructions, and listening and attending to teachers. The receptive language abilities of Group 1 children are expected to be deficient since these children are assumed to have auditory-verbal processing difficulties. However, Group 3 children may perform poorly on the receptive subdomain because they are required to respond appropriately and attentively to others. The difficulties Group 3 children often exhibit in social interactions have been demonstrated previously (e.g., Ozols & Rourke, 1985; Strang & Rourke, 1985b).

There is evidence that the adaptive behavior of Group 3 children is well-developed in areas that allow solitary activity. Group 3 children perform written communication skills in a significantly superior manner compared to Group 1 children, and in a nearly equivalent manner compared to the norms. The items of the Vineland written subdomain do not require the child to engage in a great deal of social interaction; instead, there is a focus on the completion of assignments.

Group 3 children also performed within the normative range on the coping skills subdomain (see Figure 5), although they were not significantly superior to Group 1 children on this scale. It is possible that Group 3 children were able to perform well on items requiring simple verbal responses and minimal social interaction (e.g., keeping secrets, using table manners, apologizing).

In contrast, Group 3 children perform poorly in adaptive skill areas requiring complex verbal expression (expressive subdomain), sensitivity to social norms (personal and community subdomains), and cooperative interactions with others (play and leisure time subdomain). Therefore, Group 3 children exhibit a pattern of adaptive strengths and weaknesses on the Vineland scale which may be partially explained by the characteristics of this subtype.

The hypotheses concerning the performance of Group 3 children on the Daily Living Skills and Socialization

Domains, and on the subdomains within these Domains, were not supported by the results of this study. However, the expectation that Group 3 children would exhibit more maladaptive behaviours than Group 1 children was confirmed.

### **THEORETICAL IMPLICATIONS**

The present investigation assessed the adaptive behaviour skills of subtypes of learning disabled children classified by their patterns of academic achievement. Previous research has found that children with deficient reading, spelling, and arithmetic performances on the WRAT exhibit deficiencies in neuropsychological processes thought to be subserved primarily by the left cerebral hemisphere. In contrast, children with good reading and spelling abilities, and with poor arithmetic skills, exhibit neuropsychological deficiencies in processes thought to be subserved primarily by the right cerebral hemisphere (Bourke & Finlayson, 1978; Bourke & Strang, 1978).

In addition, Group 3 children exhibit inferior performances on a nonverbal concept formation task compared to Group 2 children who are poor in reading and spelling skills relative to their arithmetic performance (Strang & Bourke, 1983). Except for the latter finding, this pattern of results obtained with older Group 3 children holds true for younger (7- and 8-year-old) children classified into these subtypes (Ozols, 1984). Group 3 children also exhibit

disturbed personality profiles on the Personality Inventory for Children. These profiles show evidence of internalized psychopathology in Group 3 children (Strang & Bourke, 1985a).

The results of the present study provide some support for the view that Group 3 children have well-developed reading skills and vocabularies, in conjunction with rather tangential expressive language characteristics. As well, the inferior performance of Group 3 children, relative to the normative sample (but not compared to Group 1 subjects), on the majority of daily living and socialization subdomains also coincides with Strang and Bourke's (1985b) description of the adaptive functioning of "classic" Group 3 children.

The results raise some interesting speculations in light of previous research findings. The neuropsychological strengths and weaknesses as well as the personality characteristics of Group 3 children have been well-defined and documented in other studies. However, the adaptive behaviour of these children has not been assessed previously by a quantitative scale such as the Vineland. It seems reasonable to infer that, if Group 3 children have neuropsychological deficiencies in right hemispherical processes which affect their nonverbal reasoning abilities, arithmetical performance, and personality functioning, then their adaptive behaviour in other areas would probably be affected as well. These children are likely to experience

difficulty when interacting socially with others and when performing daily chores around the home, as a result of their adaptive deficiencies. These expectations seem reasonable given the developmental nature of this subtype's learning disabilities which appear to pervade most aspects of these children's lives (Rourke, 1982).

The performances of Group 1 children in this study were deficient on all Vineland measures compared to the normative sample. In addition, Group 1 children obtained lower age-equivalent scores than Group 3 children on every subdomain scale, with the exceptions of the domestic and community scales within the Daily Living Skills Domain. These findings support previous research which indicates that Group 1 children are deficient in a number of adaptive areas, especially those requiring psycholinguistic skills (Rourke & Finlayson, 1978). The heterogeneity of the Group 1 population may have contributed to their poor performances on the Vineland scales. Group 1 children, with their assumed verbal and auditory-perceptual deficiencies, are expected to have difficulty with the Communication Domain of the Vineland as well as on those subdomains which require some degree of verbal competency (e.g., the interpersonal relationships and play and leisure time areas). In contrast to the Group 2 subtype, Group 1 children's psycholinguistic difficulties appear to extend into many aspects of their academic work (e.g., they are severely impaired in

mechanical arithmetic skills): It is not surprising, therefore, to find that Group 1 children are also deficient in several aspects of adaptive behaviour requiring language skills, as measured by the Vineland scales.

The evidence of more maladaptive behaviours in Group 3 children compared to Group 1 children in this study strongly supports previous research on the socioemotional functioning of these subtypes. It appears that the Personality Inventory for Children, used by Strang and Bourke (1985a), and the Maladaptive Behaviour scale, used in this study, both clearly distinguish Group 3 children from Group 1. Despite the inherent difficulty in comparing the Vineland measures with neuropsychological measures of adaptive behaviour, the Maladaptive Behaviour scale of the Vineland clearly uncovered the ~~psychopathology~~ so evident in "classic" Group 3 children. It may be cautiously assumed that the children classified as Group 3 subjects in this study adequately represented the behaviour of the Group 3 subtype. Thus, a certain degree of confidence may be placed in the other findings of this study.

#### EXPLANATION OF NONSIGNIFICANT FINDINGS

Contrary to the expected results of this study, Group 1 and Group 3 children did not differ significantly on the Daily Living Skills, Socialization, and Adaptive Behaviour Composite Domains, as well as on the subdomains within these



domains. The predicted trends for Groups 1 and 3 were also in the opposite direction for the Socialization and Adaptive Behaviour Composite Domains, with Group 3 exhibiting higher scores than Group 1. However, the adaptive behaviour skills of both Group 1 and Group 3 children appear to be generally deficient relative to the normative sample of the Vineland.

There are several explanations of the nonsignificant results found in the present study. The standard deviations for each group indicated a large degree of subject variability which served to reduce group differentiation on each of the Domain and subdomain scales. The large amount of subject variability within each group suggests several possible conditions influencing the results of this study.

The two groups probably do not constitute homogeneous populations of learning disabled children. Group 1 subjects are assumed to have verbal and auditory-perceptual deficiencies, as exhibited by children in previous studies (e.g., Rourke & Finlayson, 1978; Rourke & Strang, 1978) who were selected on the basis of uniformly deficient performances on the Reading, Spelling, and Arithmetic subtests of the WRAT. It has been demonstrated previously that children with poor reading, spelling, and arithmetic performances may have deficits in many areas of neuropsychological functioning (see Fisk & Rourke, 1979). For example, a child may do arithmetic poorly because of a sequencing difficulty, an auditory-perceptual processing

deficiency, or a visual-perceptual deficit. Thus, the large variability exhibited by Group 1 subjects in this study may be explained, in part, by the relative heterogeneity of this subtype.

The variability exhibited by Group 3 subjects is not so readily explained, however. Children in the Group 3 subtype are expected to exhibit visual-perceptual and visual-spatial deficits, with relatively well-developed verbal and auditory-perceptual abilities. Thus, children in Group 3 are expected to form a relatively homogeneous population of learning disabled children with specific abilities and deficits. However, there was a great deal of individual variation on the Vineland scales within the Group 3 subjects in the present study.

One explanation of the group variability lies in the group selection criteria used to identify Group 3 subjects. The relative levels of performance on the WRAT subtests were used as selection variables since Group 3 children exhibit a particular pattern of academic abilities and deficits. The inclusion of more stringent criteria would have insured the selection of more appropriate Group 3 subjects. For example, Ozols and Bourke (1985) use the following selection criteria for their Group 3 subjects: WRAT Arithmetic centile score below 25, WISC VIQ-PIQ difference greater than 10, WISC Performance IQ less than 90, WISC Vocabulary less than 9, WISC Object Assembly less than 8, and performance at

least 1 SD below average on the Tactual Performance Test and the Target Test. This approach was not feasible given the limited availability of such subjects. A qualitative review of the Group 3 subjects' neuropsychological profiles revealed that only 2 children met the above criteria. Thus, the majority of the children classified as Group 3 subjects in this study did not possess the typical pattern of neuropsychological abilities and deficits often associated with the Group 3 subtype.

Another possible reason for the variability of subjects in both groups is the manner in which information about the children's adaptive behaviour was obtained in the present study. The Vineland scales do not assess adaptive behaviour directly; instead, the child's parent estimates the adaptive functioning of the child in the areas of communication abilities, daily living skills, and socialization skills. Thus, the variability of scores may, in part, reflect the parent's response style rather than, or in addition to, the individual variability of the child. It must be emphasized that, while the Vineland interviews were conducted in a standardized format by the same interviewer, these interviews were semi-structured and "open-ended" in nature. This method allowed the parents to elaborate and focus on the child's behaviour as they wished, without specific restrictions on the direction of their comments.

It was observed that the reporting characteristics of Group 3 children's parents differed qualitatively from those of Group 1 children's parents. For example, the average length of time for interviews with the parents of Group 3 children was approximately 2 hours, compared to 1 hour for parents of Group 1 children. In addition, it was often difficult to keep the parents of Group 3 children focused on the topic in question; in fact, their comments and examples were sometimes inappropriate and quite tangential in nature. A few of these parents also appeared to overestimate their children's adaptive skills, as judged from the actual scores these children obtained on the Vineland scales and on the neuropsychological measures. In contrast, the parents of Group 1 children tended to respond in a brief and directed fashion with few examples (e.g., "yes", "no", or "a little bit" comments). They did not attempt to elaborate on their children's behaviour, except when prompted to do so by the interviewer.

The extent to which these issues apply to the present study is uncertain. The high interrater reliability demonstrated by the standardization sample interviewers suggests that parental response styles do not significantly influence the scoring process. However, it remains to be demonstrated empirically that interviews with parents of learning disabled children are not qualitatively different from interviews with other parents.

One method of cross-validating the parental responses would involve obtaining teacher ratings of the children's communication and socialization skills as demonstrated in the classroom. An edition of the Vineland Adaptive Behavior Scales derived exclusively for use with teachers as respondents is available by the same authors.

There is a strong possibility that several factors, including the group selection process and the particular circumstances of the data collection, may be influencing the results of this study.

It is also possible that the Vineland Adaptive Behavior Scales (VABS) do not correlate significantly with neuropsychological variables, such that specific patterns of neuropsychological strengths and weaknesses may not be related to the adaptive abilities measured by these scales. Future research is necessary to uncover the skills and abilities actually assessed by the Vineland and how they are related to the neuropsychological measures employed to identify subtypes of learning disabled children.

#### SUGGESTIONS FOR FUTURE RESEARCH

The results of this study provide partial support for the view that subtypes of learning disabled children exhibit different patterns of adaptive behaviour functioning. As mentioned previously, a number of concerns with the group selection process renders premature the conclusion that

Group 3 children differ from Group 1 children only on the Communication Domain of the Vineland. Further research is necessary to explore these findings using several possible approaches. First, it would be ideal to obtain several Group 3 subjects who exhibit the "classic" pattern of neuropsychological strengths and weaknesses previously described. Their adaptive abilities, as measured by the Vineland, could then be compared to other subtypes of learning disabled children. For example, children poor in reading and spelling, yet relatively better at arithmetic (i.e., the Group 2 subtype) would serve as a more appropriate comparison group since they probably constitute a relatively homogeneous population. The difficulty in obtaining large samples of these subtypes is considerable, however.

A second approach, therefore, might lie in comparing one or two cases of each subtype to obtain a clearer picture of how the "typical" Group 3 child would be expected to perform on the Vineland. The qualitative information derived from this approach would be invaluable in ascertaining which Vineland items are sensitive to the particular adaptive difficulties of Group 3 children.

Thirdly, it would be interesting to determine if the Vineland measures are correlated with particular neuropsychological variables. For this purpose, a R -type factor analysis, which analyzes inter-relationships and

mutual covariation around the variables' theoretical averages (Bourke & Adams, 1984) may be a useful statistical approach for future research.

The Maladaptive Behaviour Scale of the Vineland also bears further investigation. It is known that Group 3 children often have PIC profiles similar to Porter and Bourke's (1985) "internalized" subtype. While the Maladaptive scale contains a variety of internalized, externalized, and somatic items, there are no specific factor scales available to compare subtypes of children. A qualitative analysis of this scale for Group 3 children in the present study suggests that subjects with a significant maladaptive classification exhibited both internalized and externalized behaviours. Comparisons of the Maladaptive Behaviour Scale with the PIC may provide information about the item content of this scale.

The investigation into the adaptive behaviour functioning of learning disability subtypes has just begun with the present study. The VABS have been quite promising in this endeavor to-date. Future research in this area should serve a two-fold purpose in clarifying the adaptive characteristics of specific subtypes of learning disabled children, and in assessing the applicability of the Vineland scales to this population of children.

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**Appendix A.**

**DESCRIPTION OF VINELAND SUBDOMAIN CONTENT**

**A. Communication Domain**

1. Receptive subdomain. General listening and attending to verbal information and instructions. Highest age level attainable on this scale is 7 years, 10 months.
2. Expressive subdomain. How well the child uses spoken language grammatically and comprehensively, and the ability to express complex ideas (e.g., giving directions).
3. Written subdomain. Ability of child to read at grade level and write notes, messages, compositions, and letters.

**B. Daily Living Skills Domain**

1. Personal subdomain. Dressing, general health care, and grooming abilities.
2. Domestic subdomain. Doing chores around the home (e.g., housecleaning, cooking, making bed).
3. Community subdomain. Skill at telling time, date, counting and making change, using the telephone, saving and earning money.

**C. Socialization Domain**

1. Interpersonal relationships subdomain. Responding appropriately to social communication, having friends and interacting cooperatively with them, giving gifts, and belonging to groups.
2. Play and leisure time subdomain. Playing games and following rules, group activities, extracurricular activities, television and radio use, and hobbies.
3. Coping skills subdomain. Using manners in conversations and at table, controlling impulses and apologizing, being sensitive towards others, being responsible for time, borrowing and returning objects, and keeping secrets.

D. Motor Skills Domain (for individuals 5 years, 11 months or under)

1. Gross skill subdomain. General coordination ability (e.g., running, hopping, catching and throwing balls, and riding a bicycle).
2. Fine skill subdomain. Skill at doing puzzles, assembling blocks into three-dimensional constructions, ability in opening drawers, locks and doors, and skill in cutting out designs.

E. Maladaptive Behaviour Domain

1. General behaviours which are sometimes appropriate in younger children, but are usually inappropriate for older children (e.g., thumbsucking, being overly dependent, temper tantrums, and lying).

#### VITA AUCTORIS

Mary Louise Stewart was born on October 25, 1961, in Weyburn, Saskatchewan. She attended elementary schools in Lloydminster, Alberta, Moose Jaw, Saskatchewan, and Flin Flon, Manitoba. In 1979, she graduated from Hapnot Collegiate in Flin Flon, Manitoba. She received her Bachelor of Arts (Honours) in Psychology from the University of Manitoba in 1983. In September, 1983, she enrolled as a graduate student in the Human Clinical Neuropsychology program at the University of Windsor.